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(71) Applicant: **NCR INTERNATIONAL INC.**
Dayton, Ohio 45479 (US)

(72) Inventor: **Goodwin, John Coker, III**
Suwanee, Georgia 30024 (US)

(74) Representative: **Williamson, Brian et al**
International IP Department,
NCR Limited,
206 Marylebone Road
London NW1 6LY (GB)

(54) Method of displaying temporary information by an electronic price label

(57) A method of displaying temporary information by an electronic price label (EPL) which saves bandwidth and time. The method includes the steps of receiving a message containing second information by the EPL, ceasing display of first information by the EPL, displaying the second information by the EPL, reading the first information from a memory within the EPL by the EPL, and redisplaying the first information by the EPL.

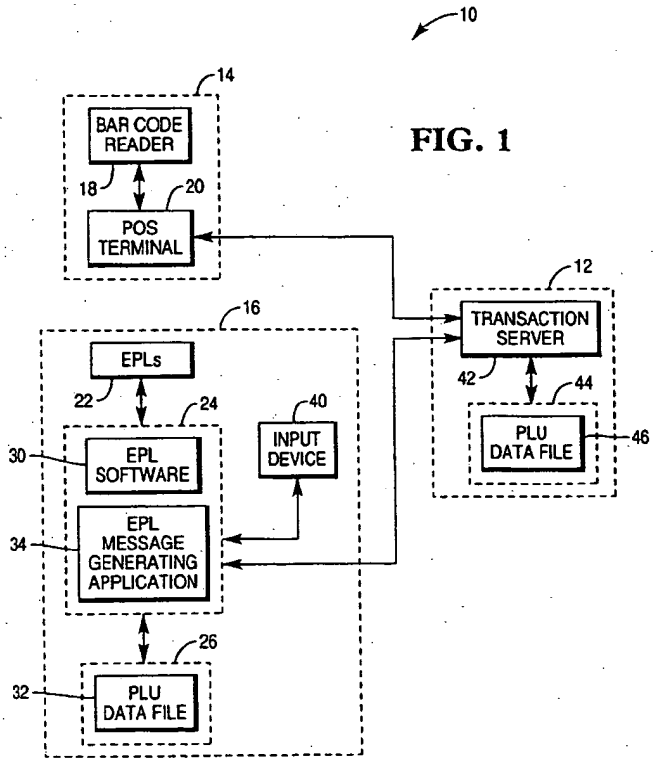

FIG. 1

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Description

[0001] The present invention relates to electronic price label (EPL) systems, and more specifically to a method of displaying temporary information by an EPL.

[0002] EPL systems typically include a plurality of EPLs for merchandise items in a transaction establishment. EPLs typically display the price of corresponding merchandise items on store shelves and are typically attached to a rail along the leading edge of the shelves. A transaction establishment may contain thousands of EPLs to display the prices of the merchandise items. The EPLs are coupled to a central server from where information about the EPLs is typically maintained in an EPL data file. Price information displayed by the EPLs is obtained from a price look-up (PLU) data file and stored within an EPL price change record.

[0003] EPLs typically include a memory for storing operating information, display information, and instructions. This memory typically includes a plurality of data registers. A typical EPL with an eight-character liquid crystal display requires one data register for storing display information. This information may include price information and promotional information.

[0004] In order to temporarily change information displayed by an EPL, a message containing the temporary information must be sent to the EPL. Following expiration of the temporary period, a message containing the originally displayed information must be sent to the EPL. In total, two messages containing the originally displayed information must be sent to the EPL, one before the temporary change and one after the temporary change.

[0005] Therefore, in order to conserve EPL system's communication bandwidth and change display states faster, it would be desirable to provide a method of displaying temporary information by an EPL which avoids having to send originally displayed information back to an EPL after displaying the temporary information.

[0006] In accordance with the teachings of the present invention, a method of displaying temporary information by an EPL is provided.

[0007] The method includes the steps of receiving a message containing second information by the EPL, ceasing display of first information by the EPL, displaying the second information by the EPL, reading the first information from a memory within the EPL by the EPL, and redisplaying the first information by the EPL.

[0008] It is a feature of the present invention that the first display information is only sent a single time to the EPL. The EPL stores the first information in its memory and obtains the first information from the memory in order to redisplay it.

[0009] It is accordingly an object of the present invention to provide a method of displaying temporary information by an EPL.

[0010] It is an advantage of the present invention that the method of displaying temporary information by an EPL avoids having to send originally displayed information back to an EPL after displaying the temporary information.

[0011] It is another advantage of the present invention that the method of displaying temporary information by the EPL also stores both primary and temporary information in the EPL.

[0012] It is yet another an advantage of the present invention that EPL system communication bandwidth is conserved.

[0013] It is still another advantage of the present invention that a previous display state can be returned to quickly.

[0014] Embodiments of the present invention will be described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a block diagram of a transaction processing system;

Fig. 2A is a block diagram of first embodiment of an EPL;

Fig. 2B is a block diagram of second embodiment of an EPL;

Fig. 3A is a flow diagram illustrating a first embodiment of the method of the present invention; and

Fig. 3B is a flow diagram illustrating a second embodiment of the method of the present invention.

[0015] Referring now to Fig. 1, transaction system 10 primarily includes host computer system 12, point-of-sale (POS) system 14, and EPL system 16. Here, components 12 and 14 are shown as separate components that are networked together, but they may also form a single component. Thus, host computer system 12 may be a POS terminal which doubles as a host computer for network of other POS terminals.

[0016] POS system 14 includes bar code reader 18 and POS terminal 20.

[0017] EPL system 16 primarily includes EPLs 22, host EPL computer 24, and EPL storage medium 26.

[0018] Host EPL computer 24 executes EPL software 30. To assist with execution of certain tasks performed by EPL software 30, EPL computer 24 includes a built-in time keeping device, commonly referred to as a system clock, which is synchronized with current time, in order to automatically execute the tasks at their scheduled times.

[0019] EPL software 30 is responsible for scheduling and transmitting price data from EPL data file 32 to EPLs 22. EPL software 30 obtains prices in PLU data file 46 as they are entered in input device 40 (immediate processing) or after they have been stored within price look-up (PLU) data file 46.

[0020] EPL computer 24 also executes EPL message generating application 34. EPL message generating application 34 records operator-entered display information and instructions and allows the operator to create messages to EPLs 22. EPL message generating appli-

cation 34 passes messages to EPL software 30 for scheduling and transmission.

[0021] EPL message generating application 34 may be any application which is designed to send and receive messages from EPLs 22.

[0022] EPL storage medium 26 stores EPL data file 32. EPL storage medium 26 and is preferably a fixed disk drive.

[0023] EPL data file 32 contains EPL identification and price checksum information. Price checksum information is calculated from price information in PLU data file 46. EPL data file 32 contains current information displayed by EPLs 22.

[0024] Input device 40 is preferably a keyboard.

[0025] Host computer system 12 includes PLU storage medium 44 and transaction server 42.

[0026] Transaction server 42 handles price requests from POS terminal 20. POS terminal 20 sends item identification information to transaction server 42 and transaction server 42 returns the corresponding price from PLU data file 46.

[0027] PLU storage medium 44 stores PLU data file 46. PLU data file 46 is available for distribution to POS terminal 20. Provision may be made for direct access to PLU data file 46 by bar code reader 18.

[0028] Turning now to Figs. 2A-2B, EPLs 22 each include battery 50, transmit and receive antenna 52, display 54, memory 56, and control circuitry 58.

[0029] Battery 50 provides power to each EPL 22.

[0030] Transmit and receive antenna 52 receives and transmits messages to EPL computer 24.

[0031] Display 54 displays price and possibly additional information, such as promotional information. Display 54 is preferably a liquid crystal display (LCD).

[0032] Memory 56 includes a plurality of data registers 60. Under the present invention, a first portion 62 of memory 56 stores primary display information 64, and a second portion 66 of memory 56 stores temporary display information 68. Thus, at least one group of data registers 60 stores temporary display information 68 and the one group includes at least one data register 60.

[0033] For example, in an EPL 22 having four data registers, one data register may be added to store temporary display information 68.

[0034] As another example, in an EPL 22 having eight data registers, four data registers may be allocated to store temporary display information 68. The four data registers may be further divided to store first, second, third, and fourth temporary display information 68.

[0035] EPL circuitry 58 controls the internal operation of EPLs 22 and includes transceiver circuitry for communicating with EPL computer 24.

[0036] In particular, EPL circuitry 58 executes instructions from EPL computer 24 which designate information to be displayed. For example, one such instruction is an instruction to display the temporary display information.

[0037] Fig. 2B differs from Fig. 2A in that EPL 22 additionally includes timer circuits 76 which signal control circuitry 58 to stop displaying temporary information 68 and return to displaying primary information 64. Thus, for example, if one data register contains temporary display information 68, a timer circuit associated with that data register signals control circuitry 58 to stop displaying temporary information 68 and return to displaying the primary information 64.

[0038] The embodiment of Fig. 2A requires a message from EPL computer 24 to signal control circuitry 58 to stop displaying temporary display information 68 and to redisplay the primary information 64.

[0039] During normal operation, control circuitry 58 receives messages from EPL computer 24, determines whether the display information in the messages is new primary display information or new temporary display information. Control circuitry 58 examines the message for a flag, command code, or other indication of primary or temporary status. If the display information is new temporary display information, control circuitry 58 determines whether a vacant temporary display group exists. If one does exist, control circuitry 58 stores the new temporary display information in the vacant temporary display group and executes the associated display instructions. If one does not exist, control circuitry 58 determines a temporary display group containing executed display information, replaces the executed display information with the new temporary display information, and executes the associated display instructions for the new temporary display information.

[0040] In the first embodiment, control circuitry 58 causes display 54 to display the new temporary display information until it receives a cancel message from EPL computer 24. In response to the cancel message, control circuitry 58 causes display 54 to display the primary display information that display 54 was displaying before displaying the new temporary display information.

[0041] In the second embodiment, control circuitry 58 causes display 54 to display the new temporary display information and initializes the associated time circuit based upon instructions in the message. Control circuitry 58 causes display 54 to stop displaying the new temporary display information when it receives a timer signal from the associated timer circuit. In response to the timer signal, control circuitry 58 causes display 54 to display the primary display information display 54 was displaying before displaying the new temporary display information.

[0042] For example, suppose a retailer enters a new item into system 10 and the retailer wishes to display "new item" as primary display information 64 on the EPL 22 assigned to the new item. Later that week, the retailer puts the new item on a one-day special promotion to boost customer awareness. In this case, temporary display information 68 could be "on sale / save .40". After the one-day special promotion has expired, the EPL 22 easily reverts back to displaying primary display information 64, "new item".

[0043] Another example relates to Plan-o-gram compliance. Suppose that after store hours a stocker needs to know how to stock shelves. Primary display information 64 is price information. Temporary display information 68, such as "01.04 I 3. 4" for a product, may be sent to an EPL 22 assigned to the product. This means that the product is in section 1, shelf 4, position 3 and has a facing value of 4 (4 wide). After the stocker has read temporary display information 68 and stocked the shelf, a cancel message or timer signal causes primary display information 64 to be displayed.

[0044] Turning now to Fig. 3A, a temporary display method corresponding to the first embodiment (Fig. 2A) is illustrated in more detail beginning with START 80.

[0045] In step 82, control circuitry 58 waits for a message from EPL computer 24. If control circuitry 58 receives a message, operation proceeds to step 84.

[0046] In step 84, control circuitry 58 determines if the message contains a cancel instruction. If it does, operation proceeds to step 86. Otherwise, operation continues to step 88.

[0047] In step 86, control circuitry 58 causes display 54 to display primary display information 64 from primary portion 62 instead of temporary display information 68. Operation returns to step 82 to wait for another message.

[0048] In step 88, control circuitry 58 determines whether the message contains temporary display information 68 or primary display information 64. If it contains primary display information 64, operation proceeds to step 90. Otherwise, operation continues to step 92.

[0049] In step 90, control circuitry 58 stores primary display information 64 from the message in primary portion 62 and causes display 54 to execute the instructions in the message, which include causing display 54 to display primary display information 64 in the message. Operation returns to step 82 to wait for another message.

[0050] In step 92, control circuitry 58 determines whether temporary portion 66 has room to store temporary display information 68. For example, if temporary portion 66 includes more than one group, control circuitry 58 looks for a vacant group. As another example, if temporary portion 66 includes a single data register 60, control circuitry 58 determines whether it is vacant. If so, operation proceeds to step 96. Otherwise, operation continues at step 94.

[0051] In step 94, control circuitry 58 clears temporary portion 66. If temporary portion 66 includes more than one group, control circuitry 58 clears one of the groups. If temporary portion 66 includes a single data register 60, control circuitry 58 determines clears that data register.

[0052] In step 96, control circuitry 58 stores temporary display information 68 from the message in temporary portion 66 and causes display 54 to execute the instructions in the message, which include causing display 54 to display temporary display information 68 in the message. Operation returns to step 82 to wait for another message.

[0053] Since only a single message is needed to convey display information to EPL 22 instead of two messages, this method saves bandwidth and quickens display changes.

[0054] Turning now to Fig. 3B, a temporary display method corresponding to the second embodiment (Fig. 2B) is illustrated in more detail beginning with START 100.

[0055] In step 102, control circuitry 58 waits for a message from EPL computer 24 or a timer signal from a timer circuit (Fig. 3B). If control circuitry 58 receives a message, operation proceeds to step 106. If control circuitry 58 receives a timer signal, operation proceeds to step 104.

[0056] In step 104, control circuitry 58 causes display 54 to display primary display information 64 from primary portion 62 instead of temporary display information 68. Operation returns to step 102 to wait for another message or timer signal.

[0057] In step 106, control circuitry 58 determines whether the message contains temporary display information 68 or primary display information 64. If it contains primary display information 64, operation proceeds to step 108. Otherwise, operation continues to step 110.

[0058] In step 108, control circuitry 58 stores primary display information 64 from the message in primary portion 62 and causes display 54 to execute the instructions in the message, which includes causing display 54 to display primary display information 64 in the message. Operation returns to step 102 to wait for another message.

[0059] In step 110, control circuitry 58 determines whether temporary portion 66 has room to store temporary display information 68. If so, operation proceeds to step 114. Otherwise, operation continues at step 112.

[0060] In step 112, control circuitry 58 clears temporary portion 66.

[0061] In step 114, control circuitry 58 stores temporary display information 68 from the message in temporary portion 66 and causes display 54 to execute the instructions in the message, which includes causing display 54 to display temporary display information 68 in the message and initializing timer circuit 76 with time information contained in the instructions. Timing information is preferably included in the message containing temporary display information 68, but may also be send in a separate message when time and/or bandwidth are not critical. Operation returns to step 102 to wait for another message.

[0062] Since only a single message is needed to convey display information to EPL 22 instead of two messages, this method saves bandwidth and quickens display changes. This method saves additional bandwidth and time because a cancel signal is not required.

[0063] Although the present invention has been described with particular reference to certain preferred embodiments thereof, variations and modifications of the

present invention can be effected within the scope of the present invention. For example, EPL group management software 34 and EPL action software 38 may be a single application.

Claims

1. A method of displaying second information followed by first information displayed previous to the second information by an electronic price label (EPL) comprising the steps of:

   (a) receiving a message containing the second information by the EPL;
   (b) ceasing display of the first information by the EPL;
   (c) displaying the second information by the EPL;
   (e) reading the first information from a memory within the EPL by the EPL; and
   (f) redisplaying the first information by the EPL.

2. A method as claimed in claim 1, further comprising the steps of:

   (g) initializing a timer circuit in the EPL by the EPL following step (c); and
   (h) receiving a signal from the timer circuit following expiration of a predetermined time period by the EPL prior to step e.

3. A method as claimed in claim 1, further comprising the step of:

   (g) receiving a message containing a command to cancel display of the second information and redisplay the first information by the EPL prior to step e.

4. A method as claimed in claim 1, wherein the first information is received by the EPL only once; comprising the steps of:

   (b) storing the first information in a memory within the EPL by the EPL;
   (c) displaying the first information by the EPL;
   (d) receiving a second message containing the second information by the EPL;
   (e) displaying the second information by the EPL;
   (f) receiving a command to redisplay the first information by the EPL;
   (g) reading the first information from the memory by the EPL; and
   (h) redisplaying the first information by the EPL.

5. A method as claimed in claim 4, wherein step d comprises the substep of:

   (d-1) receiving a third message containing a command to cancel display of the second information and redisplay the first information by the EPL.

6. A method as claimed in any preceding claim, wherein said first informal is primary display information and said second information is temporary display information.

7. An electronic price label (EPL) comprising:

   a display;
   a memory containing a first portion for storing first information and a second portion for storing second information; and
   a control circuit arranged to receive a first message containing the first information and a second message subsequent to the first message containing the second information, said circuitry being arranged to store the first information in the first portion and the second information in the second portion, which causes the display to display the first information following receipt of the first message and the second information following receipt of the second message, and which is arranged to read the first information from the first portion and causes the display to redisplay the first information following receipt of an indication to redisplay the first information subsequent to the second message.

8. An EPL as claimed in claim 7, comprising:

   a timer circuit controlled by the control circuit which provides an indication;
   wherein the control circuit initializes the timer circuit with a predetermined time period for displaying the second information.

9. An EPL as recited in claim 7, wherein the control circuit is arranged to display the second information until it receives a third message containing the indication.

10. An electronic price label (EPL) system comprising:

    a computer which sends first and second messages containing first and second information; and
    an EPL, including

    a display;
    a memory containing a first portion for storing the first information from the computer and a second portion for storing the second information from the computer; and
    a control circuit arranged to receive the first message and the second message subse-

quent to the first message, said circuitry being arranged to store the first information in the first portion and the second information in the second portion, which causes the display to display the first information following receipt of the first message and the second information following receipt of the second message, and which is arranged to read the first information from the first portion and causes the display to redisplay the first information following display of the second information.

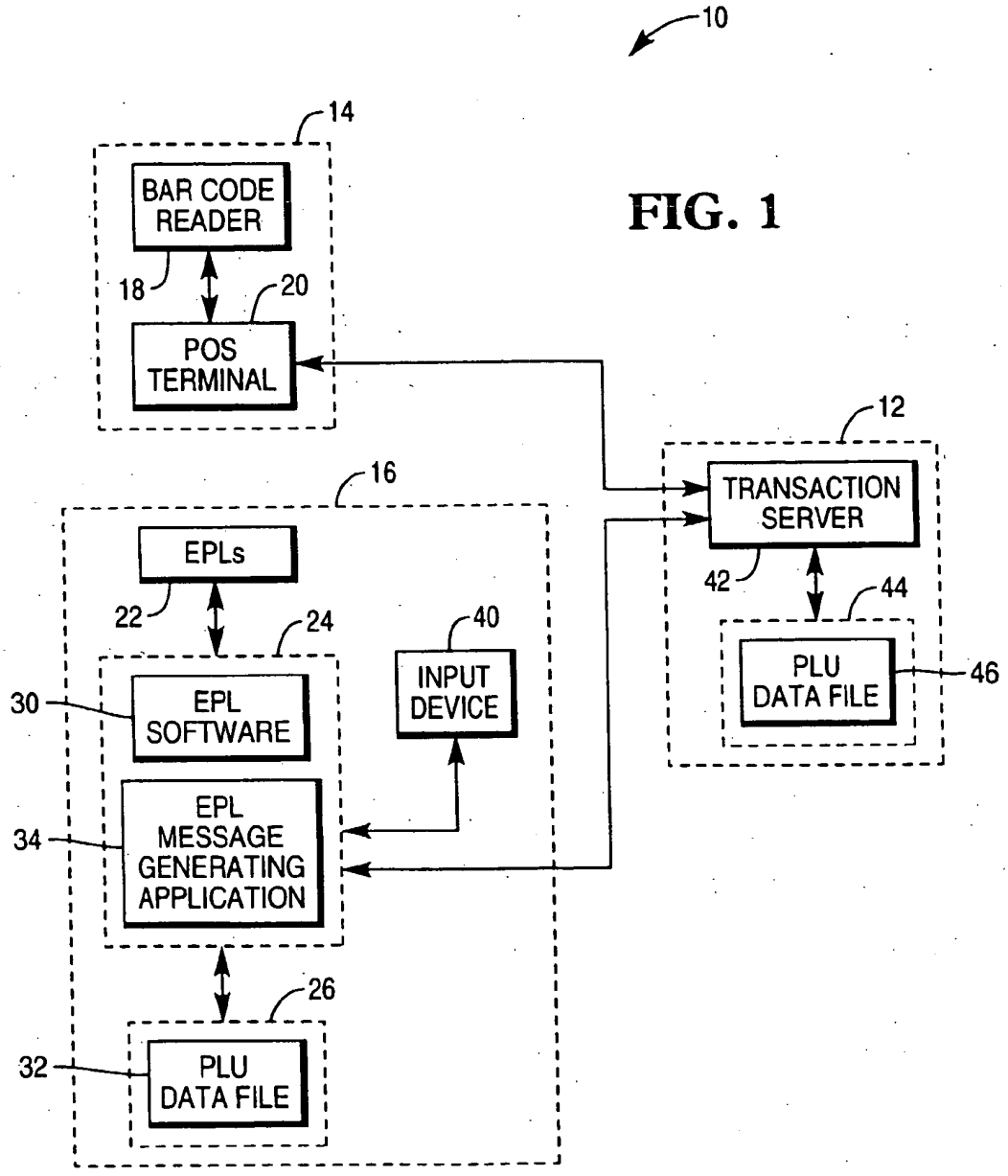

10
14
BAR CODE READER
18
20
POS TERMINAL
12
TRANSACTION SERVER
16
EPLs
22
24
40
INPUT DEVICE
42
44
PLU DATA FILE
46
30
EPL SOFTWARE
34
EPL MESSAGE GENERATING APPLICATION
26
32
PLU DATA FILE

FIG. 1

FIG. 2A

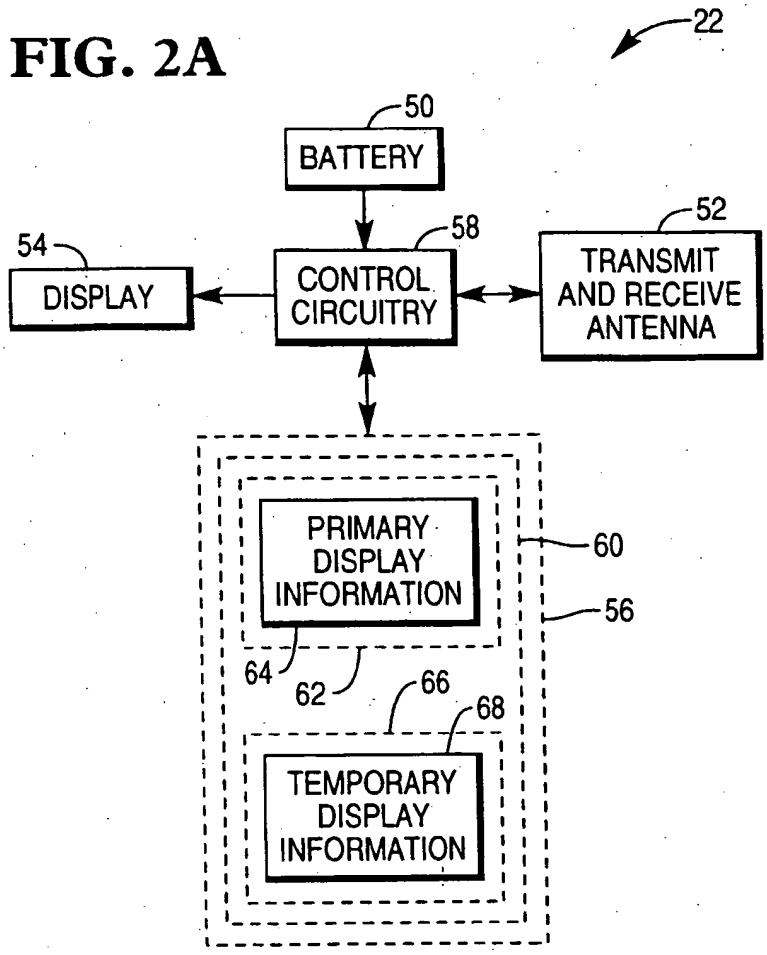

22
50
BATTERY
52
58
54
DISPLAY
CONTROL CIRCUITRY
TRANSMIT AND RECEIVE ANTENNA
PRIMARY DISPLAY INFORMATION
60
56
64
62
66
68
TEMPORARY DISPLAY INFORMATION

FIG. 2B

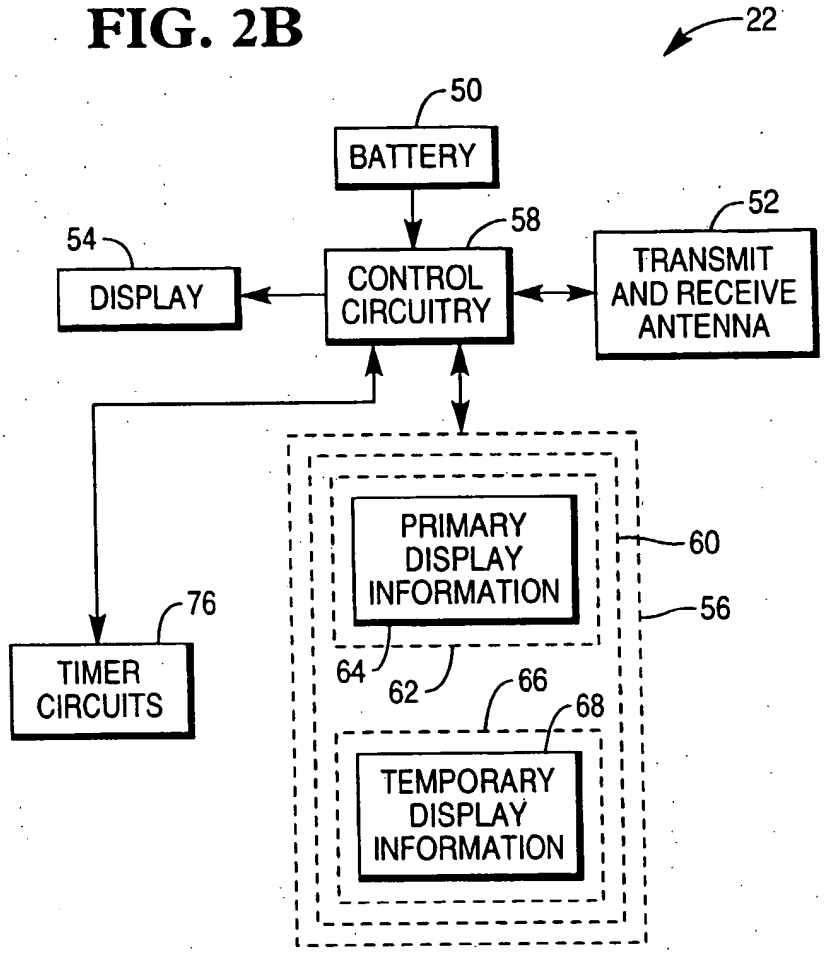

22
50
BATTERY
52
58
54
DISPLAY
CONTROL CIRCUITRY
TRANSMIT AND RECEIVE ANTENNA
PRIMARY DISPLAY INFORMATION
60
56
76
TIMER CIRCUITS
64
62
66
68
TEMPORARY DISPLAY INFORMATION

FIG. 3A

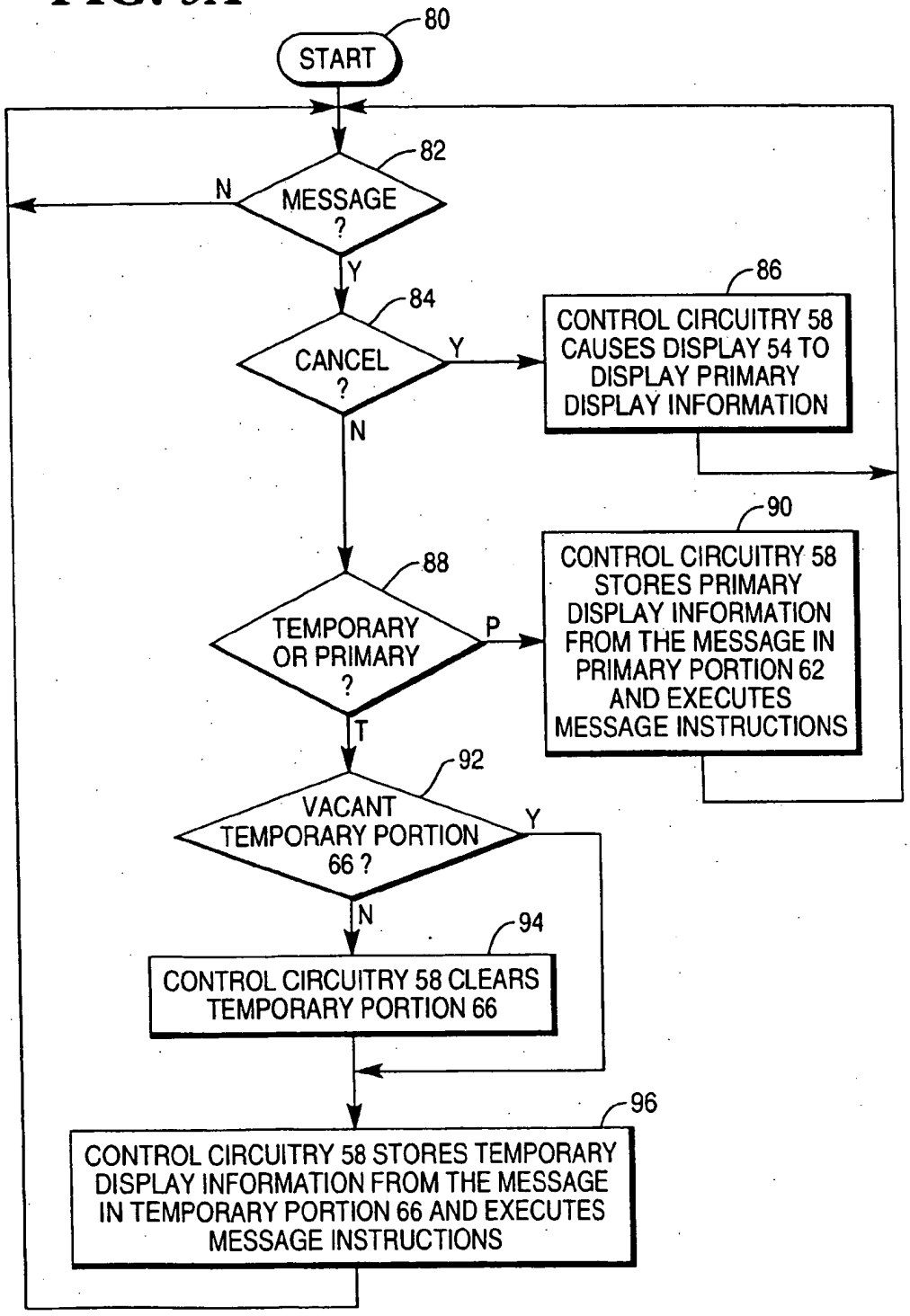
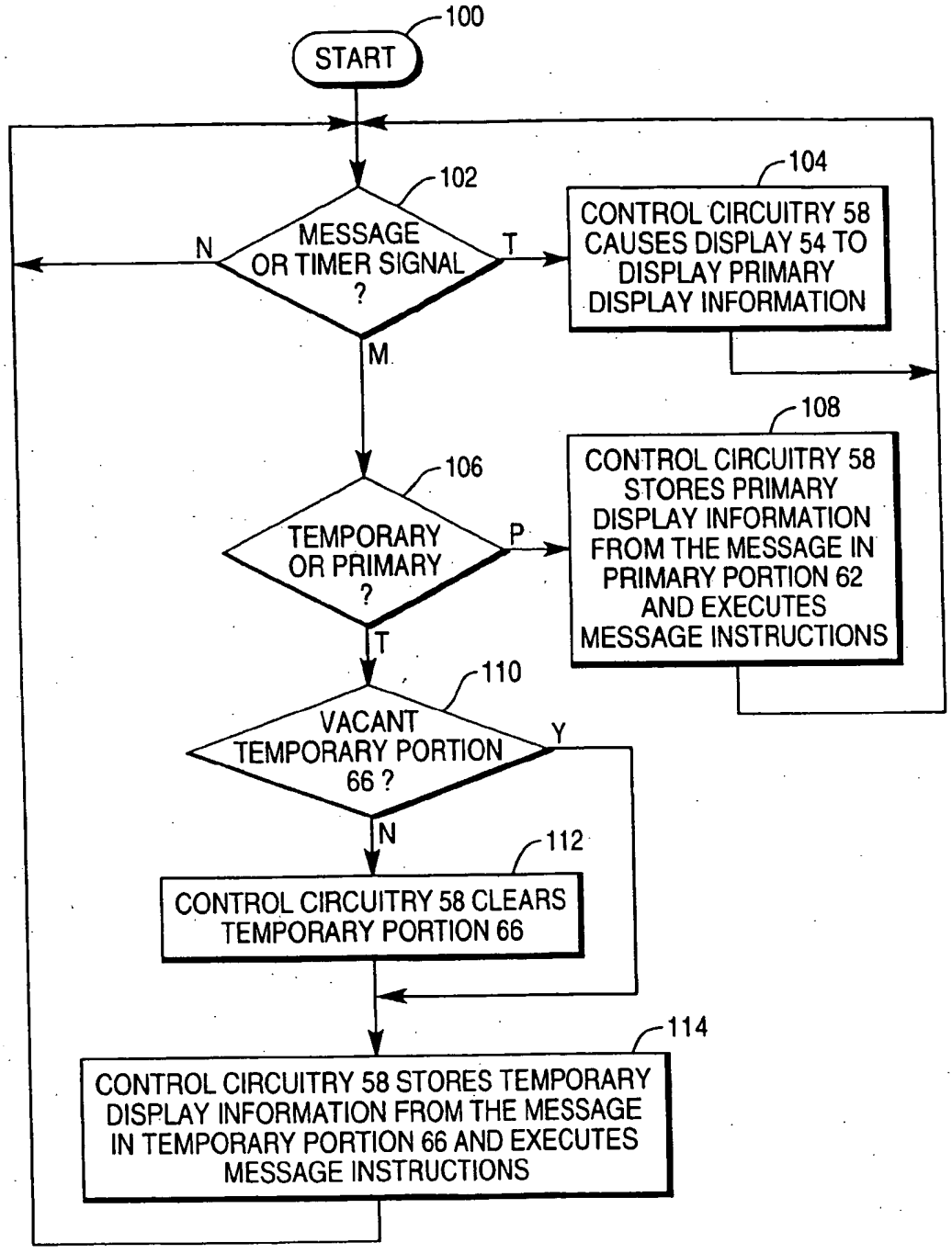

80
START
82
MESSAGE ?
N
Y
84
CANCEL ?
Y
86
CONTROL CIRCUITRY 58 CAUSES DISPLAY 54 TO DISPLAY PRIMARY DISPLAY INFORMATION
N
88
TEMPORARY OR PRIMARY ?
P
90
CONTROL CIRCUITRY 58 STORES PRIMARY DISPLAY INFORMATION FROM THE MESSAGE IN PRIMARY PORTION 62 AND EXECUTES MESSAGE INSTRUCTIONS
T
92
VACANT TEMPORARY PORTION 66 ?
Y
N
94
CONTROL CIRCUITRY 58 CLEARS TEMPORARY PORTION 66
96
CONTROL CIRCUITRY 58 STORES TEMPORARY DISPLAY INFORMATION FROM THE MESSAGE IN TEMPORARY PORTION 66 AND EXECUTES MESSAGE INSTRUCTIONS

FIG. 3B


100
START
102
MESSAGE OR TIMER SIGNAL ?
N
T
M
104
CONTROL CIRCUITRY 58 CAUSES DISPLAY 54 TO DISPLAY PRIMARY DISPLAY INFORMATION
106
TEMPORARY OR PRIMARY ?
P
T
108
CONTROL CIRCUITRY 58 STORES PRIMARY DISPLAY INFORMATION FROM THE MESSAGE IN PRIMARY PORTION 62 AND EXECUTES MESSAGE INSTRUCTIONS
110
VACANT TEMPORARY PORTION 66 ?
Y
N
112
CONTROL CIRCUITRY 58 CLEARS TEMPORARY PORTION 66
114
CONTROL CIRCUITRY 58 STORES TEMPORARY DISPLAY INFORMATION FROM THE MESSAGE IN TEMPORARY PORTION 66 AND EXECUTES MESSAGE INSTRUCTIONS

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EUROPEAN SEARCH REPORT

Application Number
EP 99 30 9545

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A	* column 2, line 5 - line 13 * * column 6, line 16 - line 41 * * column 8, line 16 - line 43 * * column 9, line 33 - column 11, line 38 * * column 13, line 22 - line 42 * * claim 1 * * figure 7 *	5	
A	US 5 704 049 A (BRIECHLE GEORGE T) 30 December 1997 (1997-12-30) * column 8, line 31 - line 67 * * column 11, line 43 - column 12, line 55 * * figures 7,8 *	1-10	
X	WO 86 02477 A (UNIGRAFIC AG) 24 April 1986 (1986-04-24)	1,2,6-8, 10	
A	* page 5, line 12 - line 28 * * page 6, line 28 - page 7, line 15 * * figure 3 *	3,4,9	TECHNICAL FIELDS SEARCHED (Int.Cl.7) G06F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	9 March 2000	Farricella, L

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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